



520 Rec'd PCT/PTO 22 OCT 1999

PCT 1635
RECEIVED
TECH CENTER 1800/2

PATENT
Attorney Docket No.: DIVER1220-2 AM 8: 4
(09010/046001)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Jay M. Short

) Group Art Unit: Unassigned

)

Application No.: 09/214,645

) Examiner: Unassigned

)

Filed: January 8, 1999

)

CERTIFICATION UNDER 37 CFR '1.8

)

For: METHOD OF DNA SHUFFLING
WITH POLYNUCLEOTIDES
PRODUCED BY BLOCKING OR
INTERRUPTING A SYNTHESIS OR
AMPLIFICATION PROCESS

)

I hereby certify that the documents referred to as enclosed herein
are being deposited with the United States Postal Service as first
class mail on October 20, 1999, in an envelope addressed to:
Assistant Commissioner for Patents, Washington, D.C. 20231

)

)

)

)

)

Margaret J. Pierce
Margaret J. Pierce 10/20/99

Assistant Commissioner for Patents
Washington, D.C. 20231

TRANSMITTAL SHEET

Sir:

Transmitted herewith for the above-identified application please find:

- (1) An Information Disclosure Statement
- (2) A Form PTO-1449;
- (3) Fifteen (15) U.S. Patent Documents;
- (4) Three (3) Foreign Patent Documents;
- (5) Fifteen (15) Other References; and
- (6) Postcard.

In re Application of:

Jay M. Short

Application No.: 09/214,645

Filed: January 8, 1999

Page 2

PATENT
Attorney Docket No.: DIVER1220-3
RECEIVED
FBI CENTER 16
99 NOV -3 AM

No fee is deemed necessary in connection with the filing of this Information Disclosure Statement. However, if any fee is required, authorization is hereby given to charge the amount of any such fee to Deposit Account No. 07-1895. A duplicate copy of this Transmittal Letter is attached.

Respectfully submitted,



Lisa A. Haile, Ph.D.

Registration No. 38,347

Telephone: (858) 677-1456

Facsimile: (858) 677-1465

Dated: October 20, 1999

GRAY CARY WARE & FREIDENRICH LLP
4365 Executive Drive, Suite 1600
San Diego, CA 92121-2189



PATENT
Attorney Docket No.: DIVER1220-2
(09010/046001)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Jay M. Short

Application No.: 09/214,645

Filed: January 8, 1999

For: METHOD OF DNA SHUFFLING
WITH POLYNUCLEOTIDES
PRODUCED BY BLOCKING OR
INTERRUPTING A SYNTHESIS OR
AMPLIFICATION PROCESS

) Group Art Unit: Unassigned

) Examiner: Unassigned

) CERTIFICATION UNDER 37 CFR 1.8

) I hereby certify that the documents referred to as enclosed herein
) are being deposited with the United States Postal Service as first
) class mail on October 20, 1999, in an envelope addressed to:
) Assistant Commissioner for Patents, Washington, D.C. 20231

) *Margaret J. Pierce*
) Margaret J. Pierce 10/20/99

Assistant Commissioner for Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with 37 C.F.R. 1.97, enclosed are references relating to the above-identified application. For the convenience of the Examiner, these references are listed on the attached Form PTO-1449 and a copy of each is enclosed herewith.

It is respectfully requested that these references be considered in the examination of this application and their consideration be made of written record in the application file.

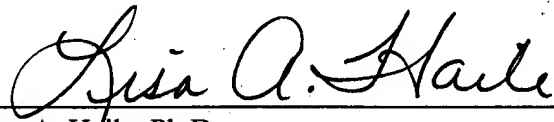
In re Application of:
Jay M. Short
Application No.: 09/214,645
Filed: January 8, 1999
Page 2

PATENT
Attorney Docket No.: DIVER1220-2
(09010/046001)

No fee is deemed necessary in connection with the filing of this Information Disclosure Statement. However, if any fee is required, authorization is hereby given to charge the amount of any such fee to Deposit Account No. 07-1895.

Respectfully submitted,

Dated: October 20, 1999



Lisa A. Haile, Ph.D.
Registration No. 38,347
Telephone: (858) 677-1456
Facsimile: (858) 677-1465

GRAY CARY WARE & FREIDENRICH LLP
4365 Executive Drive, Suite 1600
San Diego, CA 92121-2189

In re Application of:
 Jay M. Short
 Application No.: 09/214,645
 Filed: January 8, 1999
 Page 3



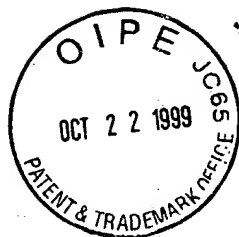
PATENT
 Attorney Docket No.: DIVER1220-2
 (09010/046001)

U.S. PATENT DOCUMENTS

| EXAM. INITIALS | DOCUMENT NUMBER | DATE | NAME | CLASS | SUB- CLASS | FILING DATE |
|-------------------|--------------------|----------|----------|-------|---------------|----------------|
| | 4683202 | 7/28/87 | | | | |
| | 4800159 | 01/24/89 | | | | |
| | 4965188 | 10/23/90 | | | | |
| | 5176995 | 01/05/93 | | | | |
| | 5187083 | 02/16/93 | | | | |
| | 5234824 | 08/10/93 | | | | |
| | 5333675 | 08/02/94 | | | | |
| | 5354656 | 10/11/94 | | | | |
| | 5605793 | 02/25/97 | Stemmer | | | |
| | 5645988 | 07/08/97 | | | | |
| | 5811238 | 09/22/98 | Stemmer | | | |
| | 5814476 | 09/29/98 | Kauffman | | | |
| | 5817483 | 10/06/98 | Kauffman | | | |
| | 5830721 | 11/03/98 | Stemmer | | | |
| | 5837458 | 11/17/98 | Minshull | | | |

FOREIGN PATENT DOCUMENTS

| EXAM. INITIALS | DOCUMENT NUMBER | DATE | COUNTRY | CLASS | SUB- CLASS | TRANSLATION (YES/NO) |
|-------------------|--------------------|----------|---------|-------|---------------|-------------------------|
| | WO91/16427 | 10/31/91 | PCT | | | |
| | WO95/22625 | 08/24/95 | PCT | | | |
| | WO97/35957 | 10/02/97 | PCT | | | |



OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages)

| | |
|--|---|
| | Stemmer, "Rapid evolution of a protein in vitro by DNA shuffling," <i>Nature</i> 8/4/94, Vol. 370, pp. 389-391 |
| | Stemmer, "DNA shuffling by random fragmentation and reassembly: In vitro recombination for molecular evolution," <i>Proceedings of the National Academy of Sciences, USA</i> , October 1994, Vol. 91, pp. 10747-10751 |
| | Smith, "The progeny of sexual PCR," <i>Nature</i> , August 4, 1994, Vol. 370, pp. 324-325 |
| | Crameri et al., "Construction and evolution of antibody-phage libraries by DNA shuffling," <i>Nature Medicine</i> , January 1996, Vol. 2, No. 1, pp. 100-102 |
| | Zhao et al., "Optimization of DNA shuffling for high fidelity recombination," <i>Nucleic Acids Research</i> , March 15, 1997, Vol. 25, No. 6, pp. 1307-1308 |
| | Patten et al., "Application of DNA shuffling to pharmaceuticals and vaccines," <i>Current Opinion in Biotechnology</i> , 1997, Vol. 8, No. 6, pp. 724-733 |
| | Krishnan, "Direct and crossover PCR amplification to facilitate Tn5supF-based sequencing of λ phage clones," <i>Nucleic Acids Research</i> , Vol. 19, No. 22, pp. 6177-6182 |
| | Meyerhans, "DNA recombination during PCR," <i>Nucleic Acids Research</i> , Vol. 18, No. 7, pp. 1687-1691 |
| | Zhao et al., "Functional and nonfunctional mutations distinguished by random recombination of homologous genes," <i>Proceedings of the National Academy of Sciences, USA</i> , July 1997, Vol. 94, pp. 7997-8000 |
| | Cadwell, "Randomization of Genes by PCR Mutagenesis," <i>Research</i> , 2:28-33 ©1992 by Cold Spring Harbor Laboratory |
| | Hermes, "Searching sequence space by definably random mutagenesis: Improving the catalytic potency of an enzyme," <i>Proc. Natl. Acad. Sci. USA</i> , Vol. 87, pp. 696-700 |
| | Reidhaar-Olson, "Combinatorial cassette mutagenesis as a probe of the informational content of protein sequences," <i>Science</i> , Vol. 241, pp. 53-57 |
| | Marks, "By-passing immunization: building high affinity human antibodies by chain shuffling," <i>Bio/Technology</i> , Vol. 10, pp. 779-783 |
| | Stemmer, "Selection of an active single chain Fv antibody from a protein linker library prepared by enzymatic inverse PCR," <i>Biotechniques</i> , Vol. 14, No. 2, pp. 256-265 |
| | Moore et al., "Strategies for the in vitro evolution of protein function: enzyme evolution by random recombination of improved sequences," <i>Journal of Molecular Biology</i> , 1997, Vol. 272, pp. 336-347 |